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VOL. 6 No. 33

AUGUST 17, 1956

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U. S. DEPARTMENT OF AGRICULTURE

Cooperative ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL BRANCH
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL BRANCH

PLANT PEST SURVEY SECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Branch serves as a clearing house and does not assume responsibility for accuracy of the material.

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Plant Pest Control Branch
Agricultural Research Service
United States Department of Agriculture
Washington 25, D. C.

Volume 6 August 17, 1956 Number 33

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

GRASSHOPPERS continue problem in Utah, Missouri, Iowa and some other States. Heavy populations in eastern Colorado, western South Dakota and in areas of Wisconsin, Minnesota and Kansas. (pp. 811, 831).

EUROPEAN CORN BORER threat continues in northern Illinois. Moth numbers still heavy in Iowa. (pp. 811, 831). FALL ARMYWORM attacking corn in some Eastern States. (p. 812). CORN ROOTWORMS prevalent in corn in eastern Nebraska and light to heavy in north central Kansas. (p. 813).

RHODES-GRASS SCALE reported from Arizona for first time. (p. 813).

Damage by second-generation ARMYWORM unusual in Nebraska. (p. 813).

SWEETCLOVER APHID found in Mississippi for first time. Widespread in Idaho. (p. 813). SPOTTED ALFALFA APHID collected in South Carolina and Kentucky for first time. This aphid is increasing in areas of Missouri and Louisiana. Infestations reported from several other States. (p. 814).

GARDEN WEBWORM moderate to heavy on alfalfa in Missouri. South Dakota and Kansas also report on this pest. (p. 815). POTATO LEAFHOPPER and PLANT BUG damage to alfalfa in Wisconsin is unusually severe. (p. 816). PLANT BUGS continue abundant in legumes in some States including South Dakota, Idaho, Kansas, Arizona. (p. 816).

Heaviest infestation of CITRUS BLACKFLY yet found in Rio Grande Valley, Texas, reported from Weslaco. (p. 818). Report on trapping records of MEXICAN FRUIT FLY in Baja California, Mexico. (p. 818). MEDITERRANEAN FRUIT FLY reported from Seminole County, Florida. (p. 818).

TWO-SPOTTED SPIDER MITE building up in beans in southwestern Idaho and damaging corn at Moses Lake, Washington. (pp. 819, 815). LEAF MINERS abundant on truck crops in Alabama. (p. 819). PEPPER MAGGOT heavy on peppers in Cherokee County, Georgia and Cleveland County, North Carolina. (p. 819). POTATO LEAFHOPPER serious on potatoes in some areas of Wisconsin; increasing on this crop in northeastern North Dakota. (p. 822). Outbreak of BEET WEBWORM between Twin Falls and Pocatello, Idaho. This insect is damaging spinach and lettuce in Rio Grande County, Colorado. (p. 822).

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NOTE change of name of Section on opposite page.

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Background report of the MELON FLY. (p. 820).

GREEN PEACH APHID continues heavy on tobacco in southern Maryland. Light to heavy in Pittsylvania County, Virginia. (p. 823).

BOLL WEEVIL migration underway in several States. Large numbers appearing in most sections of North Carolina and infestations continue to increase in Louisiana and Arkansas. (p. 824). BOLLWORMS continue main insect problem in cotton in several Texas areas. Infestations increasing in western Tennessee, Arkansas, Arizona, and Missouri. Heavy in some Georgia counties. (p. 824). CABBAGE LOOPERS of concern in cotton in several areas. SPIDER MITES continue to increase in cotton in Missouri. Increasing also in Arkansas. (p. 825). LYGUS BUG populations : high in Arizona and requiring intensive controls. (p. 826).

PINE LEAF APHID damaged pines in Maine, New York and Vermont. (p. 826). MOUNTAIN PINE BEETLE infestation of serious proportions in some Wyoming areas. (p. 826). LARCH SAWFLY causing heavy defoliation in northern Wisconsin. (p. 828). SPRUCE BUDWORM increasing in northeastern Maine. Damage reported from Lewiston, Idaho. (p. 828). A BARBERRY LEAFWORM reported from Delaware for first time. (p. 829).

SURVEY METHOD for FOREST TENT CATERPILLAR. (p. 833).

Distribution maps of RANGE GRASSHOPPERS. (p. 838).

STATES reporting - 39. CORRECTIONS. (p. 830).

WEATHER summary (p. 830). ADDITIONAL NOTES. (p. 831).

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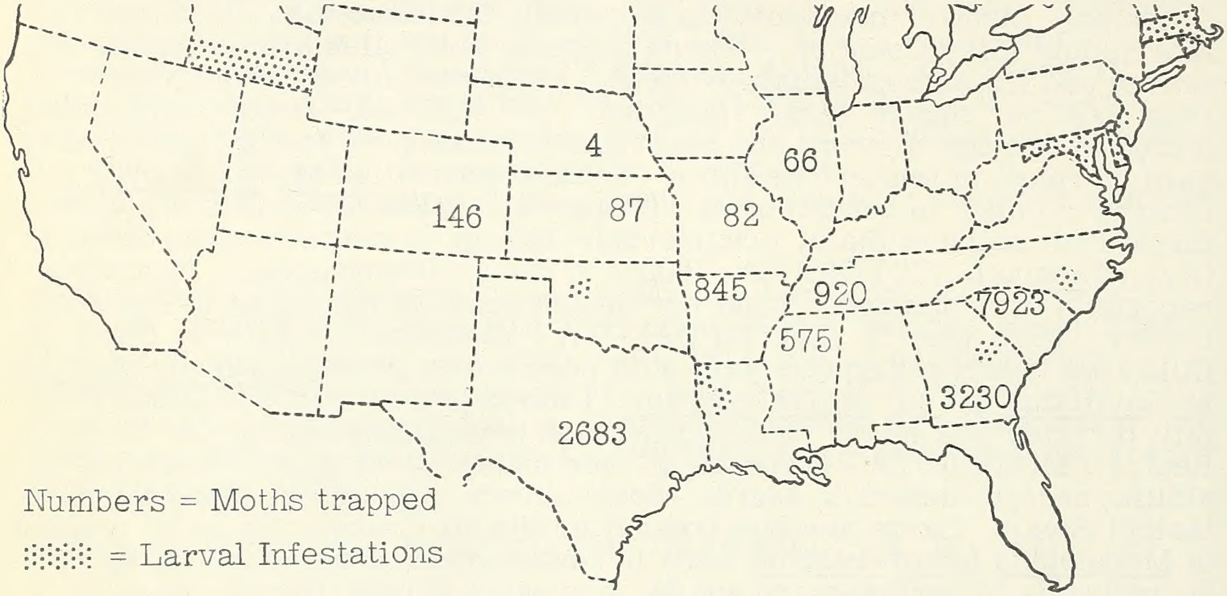
Reports in this issue are for the week ending August 10 unless otherwise designated.

CEREAL AND FORAGE INSECTS

GRASSHOPPERS - OREGON - Adult Melanoplus mexicanus and M. femur-rubrum appearing in Willamette Valley. (Capizzi). IDAHO - Heavy infestation, 25-30 per square yard, in wheatgrass and alfalfa south of Midvale. (Manis). UTAH - Continue problem in many areas, mostly in adult stage. (Knowlton). KANSAS - Late-summer adult survey shows light to severe infestations in Dickinson, Clay, Washington and Geary Counties. Light to threatening in Marshall, Pottawatomie, Wabaunsee, Morris and Riley Counties. Where properly controlled grasshoppers are scarce and little crop damage evident. In infested areas counts ranged from 2-30 per square yard. (Mathew). OKLAHOMA - Populations static, marginal damage to crops and rangeland continues. From 2-6 per square yard on range in western counties. Second-generation M. mexicanus nymphs common in central area. (Coppock). MISSOURI - Still a major threat over much of State, considerable damage to crops in some areas. (Kyd, Thomas). COLORADO - Heavy in many eastern areas. Numerous reports of crop damage. Eight per square yard on rangeland in Fremont County. (Ext. Serv.). SOUTH DAKOTA - Abundant in alfalfa in Black Hills area twenty per square yard with populations mostly Camnula pellucida, M. bivittatus and M. femur-rubrum. (Hantsbarger). NORTH DAKOTA Still threaten flax where uncontrolled high populations exist. (N. D. Ins. Rept.). MINNESOTA - From 20-45 per square yard in east central area alfalfa; second instars to adults. Some severe infestations along Mississippi River. Large acreage treated in Winona County. Up to 50 percent of Melanoplus femur-rubrum adult in southeastern area. Egg-laying by C. pellucida in northwestern and M. bivittatus in east central area. Destruction to corn leaves and silks noted in many areas. (Minn. Ins. Rept.). WISCONSIN - Heavy populations in many counties. Six to eight C. pellucida per square yard in eastern Oneida County roadsides. Heavy late hatch of M. femur-rubrum appears complete.(Wis.Ins.Bul.). Md. Heavy damage to corn in eastern Wicomico County by adults. (U. Md., Ent. Dept.). DELAWARE - Heavy feeding in alfalfa at Canterbury. (Milliron).

EUROPEAN CORN BORER (Pyrausta nubilalis) - RHODE ISLAND - Pupae abundant. (Steve). NEW JERSEY - Very numerous in central area. (Ins.-Dis. News.). DELAWARE - Numerous in whorls and tassels of late field corn and abundant in midseason sweet corn. (Milliron). MARYLAND - Fourteen egg masses per 100 plants in Frederick County. Second-brood damage generally light over State. (U. Md., Ent. Dept.). ILLINOIS - Pupation of first-generation borers almost complete but varies from field to field; averages 20-40 percent over State. Oviposition underway and ranges from a few masses to 200 or more per 100 plants in eastern and northern areas. Northern 3 tiers of counties and eastern 2 tiers south to Highway 36 may have very high second generation similar to or worse than 1955. (Ill. Ins. Rept.). WISCONSIN - Second-brood moths laying eggs in southern and southwestern counties. (Wis. Ins. Bul.). MINNESOTA MINNESOTA - Percent infestation and borers per 100 plants by districts: south central 44 and 91, southeast 30 and 30, southwest 57 and 193, west central 35 and 140. Less than one percent emergence and development is delayed. Appears only late-planted sweet corn will require treatment. (Minn. Ins. Rept.). MISSOURI - Egg-laying for third brood heavy in Juneplanted corn in southeast, as high as 68 egg masses per 100 plants. Second brood eggs still being found in central area, 10 per 100 plants. Sixty percent of second-brood moths in northwest. (Burdett). ARKANSAS Found for first time in Desha and Jefferson Counties. Light infestation, about 2 percent. (Warren, Harrendorf, Barnes). KANSAS - Very few larvae in Washington, Marshall and Pottawatomie Counties. (Matthew).

Corn Earworm as reported Week Ending 8/11



CORN EARWORM (Heliothis zea) - MASSACHUSETTS - Not heavy but increase expected. (Crop Pest Cont. Mess.). RHODE ISLAND - Light on sweet corn in Richmond, August 5. (Steve). NEW JERSEY - Build-up of eggs in one area Burlington County. (Ins.-Dis. News.). DELAWARE - Small larvae abundant in midseason corn in Bridgeville area. (Milliron). MARYLAND - In general, infestations lighter this year than normal. Moth catches increasing in Montgomery County. (U. Md., Ent. Dept.). NORTH CAROLINA - Averaged 12 eggs per silk at Faison. (Farrier). GEORGIA - Heavy on grain sorghum in Washington County. (Johnson). IDAHO - Infestation very light in southern Idaho.. First generation maturing. (Douglass et al.). OKLAHOMA - Five to 18 percent of sorghum plants infested in Woodward area. (Coppock). LOUISIANA - Thirty to 58 per 100 sweeps in alfalfa in Natchitoches and Bossier Parishes. (Oliver).

FALL ARMYWORM (Laphygma frugiperda) - NEW JERSEY - Appearing in corn. (Ins.-Dis. News.). DELAWARE - Damaging late sweet corn at Hartly. (Milliron). MARYLAND - Moderate damage to late corn in Caroline and Wicomico Counties. (U. Md., Ent. Dept.). LOUISIANA - Sixty per 100 sweeps in Bossier Parish and 30-90 per 100 sweeps in grasses in East Baton Rouge, Acadia, St. Landry and Iberville Parishes. (Oliver).

CORN ROOTWORMS (*Diabrotica* spp.) - NEBRASKA - *D. longicornis*, *D. virgifera* and *D. undecimpunctata howardi* very prevalent in corn fields in eastern third of State. As high as 22 on single corn plant. Damage to silks very noticeable. (Andersen). KANSAS - *D. virgifera* light to heavy, 3-40 beetles per stalk, in corn in some north central counties. Heavy feeding and destruction of silks in more heavily infested fields. About 10 percent of population is *D. undecimpunctata howardi* and 10 percent *D. longicornis*. (Matthew).

SUGARCANE BORER (*Diatraea saccharalis*) - TEXAS - Heavy local populations on corn in Jefferson County. (Garner).

RHODES-GRASS SCALE (*Antonina graminis*) - ARIZONA - Found infesting St. Augustine grass on 3 properties in Phoenix. This insect is new to the State and an eradication campaign may be undertaken if the scale has not become too widespread. Determined H. Morrison. (Ariz. Coop. Rept.).

ARMYWORM (*Pseudaletia unipuncta*) - NEBRASKA - Second generation damaging irrigated corn in Hall, Buffalo, Adams and Kearney Counties. First time since 1929 that second generation has caused trouble. Lower leaves destroyed by counts of 7-12 per square foot. As many as 8 per single plant. (Andersen).

WESTERN BEAN CUTWORM (*Loxagrotis albicosta*) - IDAHO - Found in 6 to 9 corn patches in Rupert area. (Douglass et al.).

CORN LEAF APHID (*Rhopalosiphum maidis*) - DELAWARE - Abundant in late corn some areas. (Milliron). SOUTH DAKOTA - Numerous on corn and sorghum in western half of State. (Hantsbarger). OKLAHOMA - Decreasing in western area due to hot dry weather. (Coppock).

FLEA BEETLES - MARYLAND - From 5-15 per plant on late corn in 3 counties. (U. Md., Ent. Dept.).

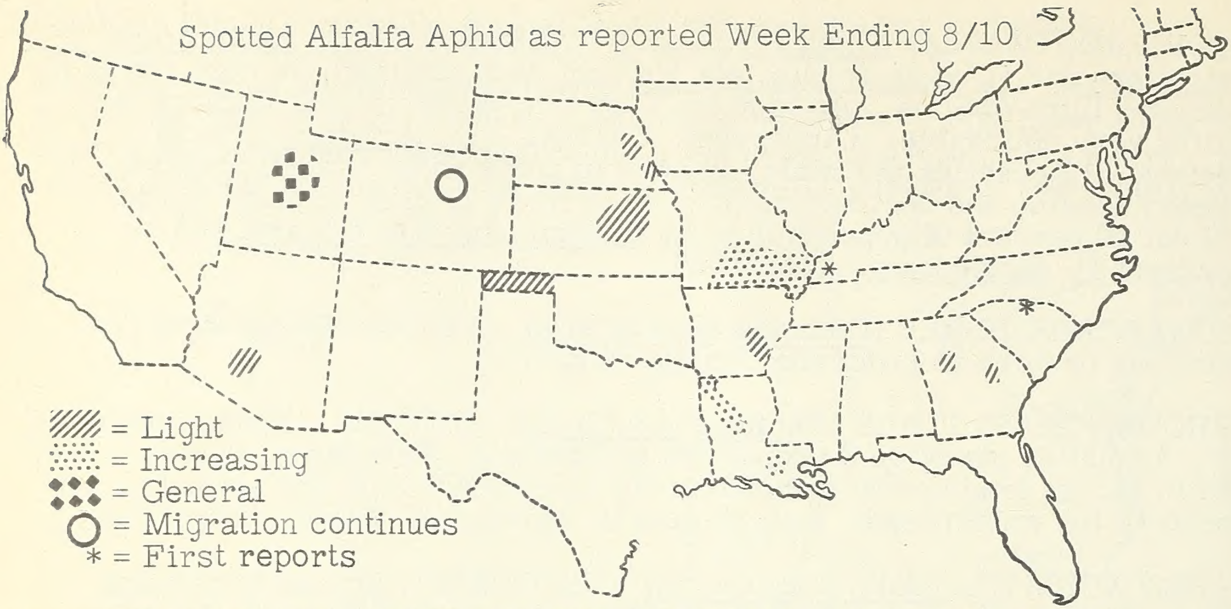
SAP BEETLES - DELAWARE - *Carpophilus lugubris* larvae causing damage to ears of sweet corn over State. (Milliron). MARYLAND - Continue abundant in corn coming to canneries. (U. Md., Ent. Dept.).

WHEAT STEM SAWFLY (*Cephus cinctus*) - NORTH DAKOTA - Average of 39 percent of stems infested in Golden Valley County. (N. D. Ins. Rept.).

SWEETCLOVER APHID (*Myzocallidium riehmi*) - IDAHO - Found over State on sweetclovers. Collections have been identified by L. M. Russell. (Manis). MISSISSIPPI - Collected from sweetclover at Booneville, Prentiss County, July 21 by R. C. Dickson. Determined by R. C. Dickson and L. M. Russell. (Hutchins). This is first report of this species from Mississippi.

AN APHID (*Macrosiphum albifrons*) - MAINE - Very abundant on stems of cultivated lupine at Orono. (Simpson).

CLOVER APHID (*Anuraphis bakeri*) - IDAHO - Low populations in red clover. Predators abundant. (Gittins).



SPOTTED ALFALFA APHID - SOUTH CAROLINA - Collected on alfalfa at Rock Hill, York County, July 30 by R. C. Dickson. Determined R. C. Dickson and L. M. Russell. (Nettles). First report of this species from South Carolina. KENTUCKY - Collected on alfalfa in Hickman County. First report for State. Determined L. M. Russell. (Starks). GEORGIA - Light on alfalfa in Washington County and in 3 fields in Henry County. (Johnson, Hinton). LOUISIANA - Increasing on alfalfa in Natchitoches, Red River, Bossier, Rapides and Assumption Parishes. Also collected in East Baton Rouge Parish. (Oliver). ARKANSAS - From 2-50 per sweep in Desha, Lincoln and Jefferson Counties. (Warren, Harrendorf, Barnes). OKLAHOMA - None found in northern and northwestern fields. Up to 200 per 10 sweeps in a few irrigated fields in panhandle. (Coppock). KANSAS - Non-economic to light, 50-2500 per 25 sweeps, in alfalfa in Dickinson, Geary, Clay, Riley, Wabaunsee, Morris, Marshall Counties. Few lady beetles noted. (Matthew). NEBRASKA - Continues to migrate northward. Light numbers, 1-3 per 10 sweeps, found in Nemaha, Johnson, Otoe, Saunders, Dodge, Cuming and Stanton Counties. (Andersen). MISSOURI - Increasing in south central and southeast areas, 2-25 per sweep in most fields. Some damage in individual fields having 100-225 aphid per sweep. Predators increasing in more heavily infested fields. (Kyd, Thomas). UTAH - Emery and Carbon Counties generally infested. Thousands of acres being cut to save spraying in Sanpete, Sevier, Emery and other counties. (Knowlton). IDAHO - Aphids reported earlier this year as this species have been found to be sweetclover aphid (Myzocallidium riehmi). So far in 1956, no spotted alfalfa aphid has been collected in Idaho. (Manis). COLORADO - Continues to advance from southern to northern counties. (Exp. Sta.). ARIZONA - Sub-economic numbers on alfalfa in areas of Maricopa County. (Ariz. Coop. Rept.).

GREEN CLOVERWORM (Plathypena scabra) - DELAWARE - Continues destructive to soybeans. Very abundant in alfalfa at Canterbury. (Milliron).

CLOVER SEED CHALCID (Bruchophagus gibbus) - WASHINGTON -

Averaged 100 per 25 sweeps in red clover for seed near Quincy. (Johansen).

PEA APHID (*Macrosiphum pisi*) - COLORADO - Continues high in some fields. Predation and parasitism reaching peak. (Exp. Sta.). SOUTH DAKOTA - General in western area, up to 60 per 10 sweeps in one field. (Hantsbarger). IDAHO - Population reduced on red clover and alfalfa in southwestern and south central areas. (Gittins). UTAH - Serious in many counties on alfalfa. Unusually abundant for time of year. (Knowlton).

THREE-CORNERED ALFALFA HOPPER (*Spissistilus festinus*) - GEORGIA Two hundred per 100 sweeps on alfalfa in Washington County. (Johnson). ALABAMA - Damage to sericea lespedeza in Chambers County. (Blake). ARKANSAS - Increased in Chicot, Desha, Lincoln and Jefferson Counties. Up to 3 per sweep. (Warren, Harrendorf, Barnes). ARIZONA - Common in alfalfa in Maricopa County; 26-36 per 4 sweeps. (Ariz. Coop. Rept.). LOUISIANA - From 180-310 per 100 sweeps in alfalfa in Bossier, Natchitoches, Red River and Assumption Parishes and from 86-140 per 100 in soybeans in Assumption, Ascension, Iberville and Pointe Coupee Parishes. (Oliver).

SPIDER MITES - MARYLAND - Moderate to heavy defoliation to soybeans in Dorchester County. (U. Md., Ent. Dept.). WASHINGTON - Heavy infestation of *Tetranychus telarius* whitening foliage of corn near Moses Lake. Up to 100 per leaflet on red clover near Moses Lake and Quincy. Ladino clover, beans and sugar beets also affected. (Johansen). Slight outbreak of *T. telarius* on alfalfa for seed around Gardena. Some control. (Cook).

ALFALFA WEEVIL (*Hypera postica*) - SOUTH DAKOTA - Six larvae per 10 sweeps in alfalfa field in Custer County. (Hantsbarger).

CLOVER ROOT CURCULIO (*Sitona hispidula*) - GEORGIA - Forty per 100 sweeps on alfalfa in Washington County. (Johnson).

SWEETCLOVER WEEVIL (*Sitona cylindricollis*) - NEBRASKA - Five to 7 per 25 sweeps in alfalfa in southeastern area. (Andersen).

RED-NECKED PEANUTWORM (*Stegasta bosqueella*) - GEORGIA - Moderate to heavy infestations throughout peanut area. (Johnson).

A TERMITE (*Reticulitermes* sp.) - NORTH CAROLINA - Extensive tunneling in tap root and stems in peanuts causing wilting and pod damage in a field in Gates County. (Artz, Dogger).

GARDEN WEBWORM (*Loxostege similalis*) - SOUTH DAKOTA - Some economic damage in an alfalfa field in Jerauld County. (Lofgren). MISSOURI - Moderate to heavy on alfalfa over State, 4 - 16 per 10 sweeps. Considerable damage to new growth in many areas. (Kyd, Thomas). KANSAS - Heavy in a few alfalfa fields in Wabaunsee, Morris, Dickinson and Clay Counties; 4-12 larvae per sweeps in most fields. (Matthew).

ALFALFA CATERPILLAR (*Colias philodice eurytheme*) - NEBRASKA -

Adults continue prevalent, 3-7 per square yard, in southeastern and northeastern areas. From 5-8 larvae per 10 sweeps. (Andersen).

ALFALFA WEBWORM (Loxostege commixtalis) - NEBRASKA - From 8-12 larvae per 25 sweeps in alfalfa in southeastern area and 4-5 per 25 sweeps in northeastern area. Webbing noticeable. (Andersen).

POTATO LEAFHOPPER (Empoasca fabae) - WISCONSIN - Still threatens alfalfa. Appears 3 generations will be completed. Damage to second-crop alfalfa by this species and plant bugs worst in many years; marked reduction in yields. (Wis. Ins. Bul.). MARYLAND - One to 8 per sweep in alfalfa in Washington County. (U. Md., Ent. Dept.). MISSOURI From 0.5 to 5 per sweep on alfalfa in extreme southeast; a few fields show yellowing. (Kyd, Thomas).

BLISTER BEETLES - SOUTH DAKOTA - Epicauta pennsylvanica abundant on alfalfa in some western fields. Eighteen per 10 sweeps in one Butte County field. (Hantsbarger). NEBRASKA - E. pennsylvanica averaging 12 per 10 sweeps on alfalfa in southeast. Epicauta sp. averaging 8 per 10 sweeps on this crop also. (Andersen). OKLAHOMA - Epicauta sp. common in alfalfa, 7-25 per 10 sweeps. (Coppock).

PLANT BUGS - WISCONSIN - Adelphocoris lineolatus, A. rapidus and Lygus lineolaris together with potato leafhopper causing worst damage in years to second-crop alfalfa. (Wis. Ins. Bul.). SOUTH DAKOTA - Lygus numerous in alfalfa in western area, concern to seed growers. One field in Custer County had 80 per 10 sweeps. (Hantsbarger). IDAHO - Lygus extremely abundant on most alfalfa and clover in southwestern and south central areas following general second cutting. Up to 30 per sweep, mostly adults, in some fields. Averages of 10 and 15 per sweep recorded. (Gittins). KANSAS - Abundant, 2-12 per sweep, in alfalfa in Wabaunsee, Pottawatomie, Riley, Clay, Washington and Marshall Counties. New generation of nymphs appearing. (Matthew). ARIZONA - High counts, 50-125 per 4 sweeps, in irrigated alfalfa in Maricopa County. From 400-1060 per 100 sweeps in 9 alfalfa seed fields at Yuma. (Ariz. Coop. Rept.).

STINK BUGS - VIRGINIA - Sehirus cinctus averaged 15-20 per plant on alfalfa in Culpeper County field late in June. Determined R. I. Sailer. (Rowell, Heltzel). ARIZONA - Twenty to 66 brown stink bugs per 100 sweeps in alfalfa seed fields at Yuma. (Ariz. Coop. Rept.).

YELLOW-STRIPED ARMYWORMS - UTAH - Increasing and damage of concern on alfalfa and tomatoes in several northern counties. (Dorst, Knowlton). ARIZONA - Prodenia sp. averaged 16 per 4 sweeps in alfalfa at Gilbert. Lighter in other areas of Maricopa County. (Ariz. Coop. Rept).

FRUIT INSECTS

CODLING MOTH (Carpocapsa pomonella) - OHIO - First second-brood entry August 1. Entries light. (Cutright). INDIANA - General increase in adult activity in Vincennes area indicates that third-brood larvae will reach peak last two weeks of August. (Hamilton). Steady build-up of new entries expected until about September 3 in Orleans area. (Marshall). ILLINOIS - Between broods in Carbondale area. (Chandler). MINNESOTA Second-generation larvae entering fruit in LaCrescent area. Very high populations noted some orchards. (Minn. Ins. Rept.). WASHINGTON - Second-brood larvae entering fruit in Yakima Valley, July 29-30. (Yakima Spray Bul.).

RED-BANDED LEAF ROLLER (Argyrotaenia velutinana) - INDIANA - Adults increasing in bait trap catches in Vincennes area. (Hamilton). ILLINOIS - Adults of third generation and larvae in some orchards of Carbondale area. (Chandler). MINNESOTA - Causing considerable damage some orchards. (Minn. Ins. Rept.).

UNSPOTTED TENTIFORM LEAF MINER (Callisto geminatella) - ILLINOIS - Moderately heavy infestation in Jefferson County and a number of new infestations in Jackson and Union Counties. (Chandler).

APPLE MAGGOT (Rhagoletis pomonella) - RHODE ISLAND - Still abundant in neglected orchards. (Steve). MASSACHUSETTS - Migrant flies from abandoned orchards threatening fruit. (Crop Pest Cont. Mess.). MINNESOTA - High numbers of adults emerging all areas. (Minn. Ins. Rept.).

APPLE APHID (Aphis pomi) - WASHINGTON - Reinfestation of growing apple tips a problem in Yakima Valley. (Yakima Spray Bul.). Heavy infestation of suckers of apples at Pullman. (Johansen).

ORCHARD MITES - INDIANA - Increasing in Orleans area. (Marshall).

EUROPEAN RED MITE (Metatetranychus ulmi) - OHIO - Damaging infestation many orchards of northern area. (Cutright).

LEAFHOPPERS - NORTH DAKOTA - Heavy infestation on apple and caragana nursery stock over much of State. (N. D. Ins. Rept.).

EUROPEAN EARWIG (Forficula auricularia) - WASHINGTON - Becoming serious pest of young trees in Yakima Valley. (Yakima Spray Bul.).

JAPANESE BEETLE (Popillia japonica) - MARYLAND - Has damaged plum and cherry trees in Washington County. (U. Md., Ent. Dept.). VIRGINIA - Damaging grapes and other hosts at Goshen, Rockbridge County. (Rowell).

GREEN JUNE BEETLE (Cotinis nitida) - VIRGINIA - Severe and eating peaches one locality of Norfolk County. (Wood).

CHERRY FRUIT FLY (*Rhagoletis cingulata*) - IDAHO - Survey in Weiser area shows many pupae in soil. (Manis, Gittins, Hackler).

WALNUT CATERPILLAR (*Datana integerrima*) - MARYLAND - Abundant on black walnut trees in Wicomico County. (U. Md., Ent. Dept.).

A CATERPILLAR (*Datana* sp.) - NEW JERSEY - Again increasing in blueberries and large numbers of moths appearing in some areas. (Ins.-Dis. News.).

GRAPEVINE APHID (*Aphis illinoisensis*) - DELAWARE - Abundant on grapes at Newark. (Milliron).

Citrus Insect Situation, Florida, First Week of August

PURPLE SCALE activity increased and further increase expected. FLORIDA RED SCALE activity increased slightly and some increase expected. New hatch continued. CITRUS RED MITE activity increased sharply. Little change expected. CITRUS RUST MITE again increased sharply. Declining trend expected. (Pratt, Thompson, Johnson).

CITRUS BLACKFLY (*Aleurocanthus woglumi*) - TEXAS - Heaviest infestation found so far was discovered July 24 in a commercial citrus grove 2 1/2 miles south of Weslaco on the Progresso Highway. Ten trees found infested with 90 pupae and 43 eggs on 15 leaves. About 90 percent of pupae were parasitized. (PPC).

MEXICAN FRUIT FLY (*Anastrepha ludens*) - MEXICO - In early July a female adult was trapped in downtown Tijuana, Baja California. Eleven specimens have been trapped in Tijuana this season and a total of 42 flies has been collected in Baja California since the initial find January of 1954. In addition to Tijuana, specimens were collected in Ensenada and Mexicali. Eradication programs are continuing in the infested areas. (PPC).

MEDITERRANEAN FRUIT FLY (*Ceratitis capitata*) - FLORIDA - Two adults captured August 10 in Seminole County just north of Orange County. (PPC).

TRUCK CROP INSECTS

COLORADO POTATO BEETLE (*Leptinotarsa decemlineata*) - DELAWARE - Injurious to late potatoes near Masten's Corner and prevalent on untreated tomatoes several areas. (Milliron).

FLEA BEETLES - MINNESOTA - Injuring potatoes in Red River Valley area. (Minn. Ins. Rept.).

POTATO FLEA BEETLE (*Epitrix cucumeris*) - WISCONSIN - Second generation moderately numerous on potatoes in Kenosha and Racine Counties. (Wis. Ins. Bul.). NORTH DAKOTA - New generation in Red River Valley potato fields. (N. D. Ins. Rept.).

APHIDS - MAINE - Numbers relatively small on untreated potatoes in Presque Isle and vicinity but populations doubled. In central and southern Aroostook County, counts generally low. *Aphis abbreviata* and *Macrosiphum solanifolii* predominated with *Myzus persicae* and *M. solani* also present. (Shands).

TOMATO FRUITWORM (*Heliothis zea*) - ARIZONA - From 4-8 per 100 plants at Bowie and nine per 100 plants at San Simon, Cochise County, August 3. (Ariz. Coop. Rept.).

TWO-SPOTTED SPIDER MITE (*Tetranychus telarius*) - IDAHO - Infestations building up in beans in Elmore and Twin Falls Counties and some damage in two bean fields checked in Gooding County. Heavy damage to potato fields in Bonneville and Jefferson Counties. Some plants killed on five farms in Bonneville County where 60-70 percent of potatoes involved. Most of damage on margins adjacent to alfalfa. (Gittins, Kohl, Douglass et al.,).

SERPENTINE LEAF MINER (*Liriomyza* sp.) - ALABAMA - Abundant on tomatoes, wax beans, butter beans, watermelons, okra, field peas and squash in many areas of State. Many areas show 80-95 percent of leaves attacked. (Guyton et al.).

SEED-CORN MAGGOT (*Hylemya cilicrura*) - WISCONSIN - Heavy infestation in recently-emerged wax beans in Dane County. (Wis. Ins. Bul.).

MARGINED BLISTER BEETLE (*Epicauta pestifera*) - DELAWARE - Damaging lima beans near Andrewsville. (Milliron).

AN INTRODUCED FLEA BEETLE (*Phyllotreta cruciferae*) - DELAWARE Very destructive to small cabbage plants in commercial acreage west of Dover and to older planting near Harrington. (Milliron).

CABBAGE APHID (*Brevicoryne brassicae*) - COLORADO - Populations 200 per plant in Fremont County. (Ext. Ser.).

SWEETPOTATO FLEA BEETLE (*Chaetocnema confinis*) - LOUISIANA Increasing on sweetpotatoes in St. Landry Parish. (Oliver).

SOUTHERN GARDEN LEAFHOPPER (*Empoasca solana*) - LOUISIANA - Populations increasing in sweetpotatoes in St. Landry Parish. (Oliver).

PEPPER MAGGOT (*Zonosemata electa*) - NORTH CAROLINA - Severe and rather extensive infestation in red peppers in Cleveland County. (Jones). GEORGIA - Heavy infestations in pimento peppers in Cherokee County. (Johnson). A 92-percent infestation in one field. (Maxey).

THE MELON FLY

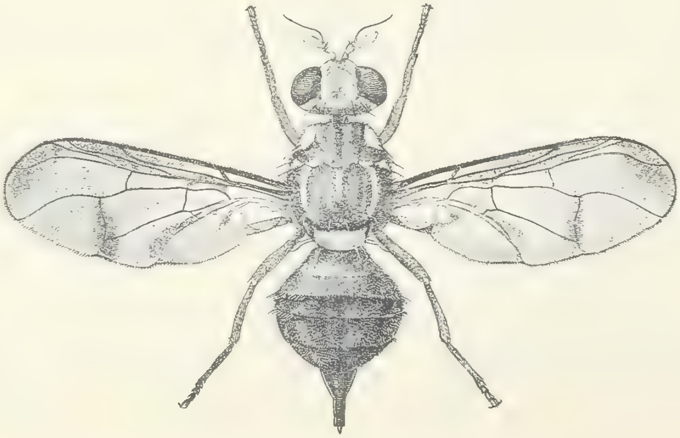
The recent finding of a single gravid female Dacus cucurbitae on the campus of the University of California at Los Angeles is of interest as this pest is not known to be established in the United States. The specimen was collected in a bait trap on July 24. No additional specimens have been found even though an intensive survey was immediately initiated.

This species is considered the most important cucurbit pest of the Indo-Malayan region where it originated. About 1895 the melon fly was introduced into Hawaii. There, the pest has made it practically impossible to grow cantaloups in the Honolulu area and it has seriously curtailed the production of melons, cucumbers and tomatoes. As early as 1915 losses from the insect reached nearly $1,000,000 annually. The species has caused severe damage to cucurbits in Formosa and in the North-West Frontier Province of India (an area now included in Pakistan). Although the insect is primarily a pest of melons and other cucurbits, its preferred hosts are not limited to these plants. Preferred food plants include: cantaloup, chayote, Chinese cucumber, Chinese melon, cowpea, cucumber, gourds, squash, string beans, tomatoes, watermelon and pumpkin. Plants sometimes infested are bellapple (passiflora), eggplant, fig, mango, orange, papaya and peach. The entire host list includes over 80 species of plants.

Areas from which the melon fly has been recorded are Africa (Kenya only); Mauritius; Asia-Burma, Ceylon, China, Formosa (Taiwan), India, Indonesia, Malaya, Pakistan; Okinawa; Philippines; Mariana Islands-Guam, Saipan, Tinian; and Hawaii.

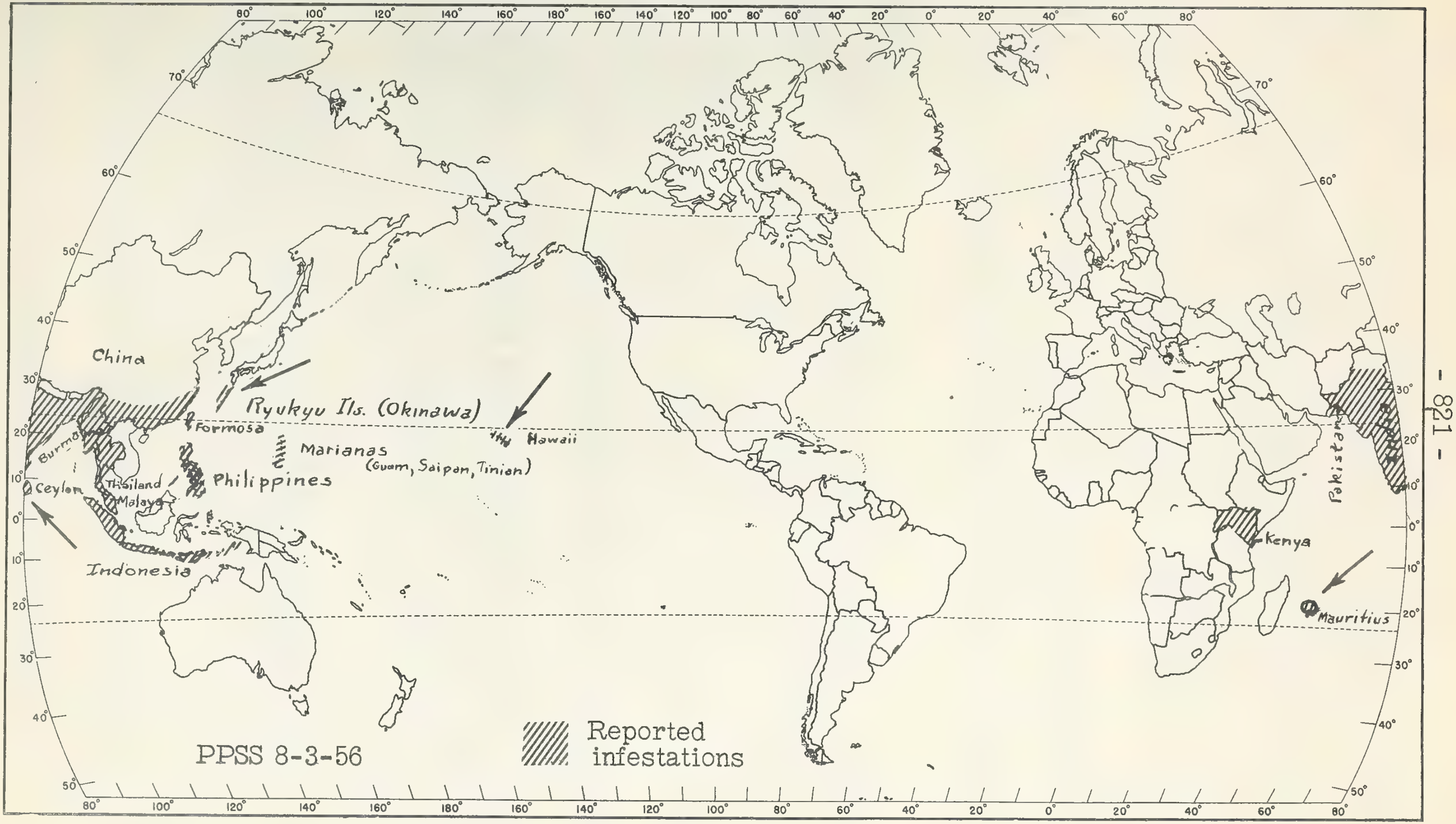
Control methods include malathion bait sprays. To some extent protective covering by soil, paper or cloth is still used.

The adult melon fly is about one-fourth of an inch long, with a wing spread of nearly one-half inch, and has a yellowish brown body. The markings between the wings are bright canary yellow banded with dark brown.



Melon fly female (greatly enlarged)

Recorded Distribution of MELON FLY (Dacus cucurbitae Coq.)



CUTWORMS - GEORGIA - Heavy infestations injuring foliage of pimento peppers in Henry County. (Dupree).

EUROPEAN CORN BORER (Pyrausta nubilalis) - DELAWARE - Injuring fruits and stems of commercial peppers in Bridgeville area. Loss moderately heavy one field. (Milliron). MARYLAND - Moderate damage to peppers in Somerset County. (U. Md., Ent. Dept.).

GREEN PEACH APHID (Myzus persicae) - DELAWARE - Increasing on peppers several areas, especially near Bridgeville. (Milliron).

HORNWORMS (Protoparce spp.) - DELAWARE - Continue to infest a large acreage of tomatoes near Canterbury. Light elsewhere. (Milliron). IDAHO - Light infestations on tomatoes in Twin Falls area. (Douglass et al.). Light but general infestations on tomatoes in Twin Falls and Elmore Counties. (Gittins, Manis). ARIZONA - Injuring tomatoes and peppers at Bowie, Cochise County, Aug. 3. (Ariz. Coop. Rept.).

CABBAGE LOOPER (Trichoplusia ni) - DELAWARE - Causing most of conspicuous leaf damage to tomatoes except at Canterbury. Feeding extensively on potatoes at Rising Sun. (Milliron). WISCONSIN - Medium populations with Pieris rapae and Plutella maculipennis building up in Kenosha and Racine Counties. (Wis. Ins. Bul.).

POTATO APHID (Macrosiphum solanifolii) - DELAWARE - Increasing on tomatoes from Mt. Pleasant southward and prevalent on potatoes. (Milliron).

TOBACCO FLEA BEETLE (Epitrix hirtipennis) - DELAWARE - Increasing on tomatoes generally. (Milliron).

POTATO LEAFHOPPER (Empoasca fabae) - MARYLAND - Averaged two per sweep on lima beans in Caroline and Dorchester Counties.(U. M.). WISCONSIN - Serious on potatoes in Kenosha and Racine Counties. "Hopperburn" prevalent in unsprayed or poorly-sprayed fields. (Wis. Ins. Bul.). NORTH DAKOTA - Increasing in potatoes in upper Red River Valley with "hopperburn" injury where fields not treated recently. (N. D. Ins. Rept.).

BEET WEBWORM (Loxostege sticticalis) - COLORADO - Serious damage to spinach and lettuce in Rio Grande County. (Chem. Ind., Exp. Sta.). IDAHO - Outbreak in area extending from Twin Falls to Pocatello. Survey in progress. A 400-acre potato field in Power County with considerable webbing and larvae numerous. Heaviest infestations occur around Oakley. (Daigh, Schow, Gittins, Douglass et al.).

CLOVER CUTWORM (Scotogramma trifolii) - IDAHO - Attacking beets in south central area. More numerous than beet webworm in some fields. (Douglass et al.).

SIX-SPOTTED LEAFHOPPER (Macrosteles fascifrons) - COLORADO -

Appearing in Otero, Weld, Boulder and Mesa Counties. (Exp. Sta.).

SQUASH VINE BORER (Melittia cucurbitae) - WISCONSIN - Damage reported in Jackson County. (Wis. Ins. Bul.).

LEAF-FOOTED BUG (Leptoglossus phyllopus) - ALABAMA - Damaging cucumbers and tomatoes. (Guyton).

CUCUMBER BEETLES - WEST VIRGINIA - Acalymma vittata and Diabrotica undecimpunctata howardi damage heavy statewide. (Dorsey, Hansen).

ONION THRIPS (Thrips tabaci) - IDAHO - Populations building up in fields with no onion maggot control. In one field southwestern area, 60-70 percent of leaf surface destroyed. (Scott).

ONION MAGGOT (Hylemya antiqua) - IDAHO - Continues severe. Adults at 1-2 per square foot in some fields of Boise Valley area. (Scott).

TOBACCO INSECTS

GREEN PEACH APHID (Myzus persicae) - MARYLAND - Populations remain heavy on tobacco in Calvert and St. Marys Counties. Winged forms abundant on top leaves. Some mortality due to fungus. (U. Md., Ent. Dept.). VIRGINIA - Light to heavy in Pittsylvania County. Infestations generally spotted and predators numerous. (Dominick).

BUDWORMS (Heliothis spp.) - MARYLAND - H. virescens averaged four per 25 plants in southern St. Marys County. (U. Md., Ent. Dept.). NORTH CAROLINA - Some fields with 3-4 larvae per 25 plants but mainly on suckers and buds. (Farrier). Numerous some fields in Onslow County with H. zea and H. virescens present. (Scott, Rabb).

HORNWORMS (Protoparce spp.) - MARYLAND - Second-brood eggs average 3.5 per 25 plants in eight fields in St. Marys County. Some small larvae. (U. Md., Ent. Dept.). VIRGINIA - Infestation of 10 eggs and eight larvae per 25 plants in two fields of late green tobacco in Pittsylvania County. Insecticides being applied. (Dominick). NORTH CAROLINA - Averaged 2.1 eggs and slightly less than one larva per 25 plants in east central counties. Some larvae in last instar and numerous fields being treated. (Farrier).

TOBACCO FLEA BEETLE (Epitrix hirtipennis) - MARYLAND - Light to moderate on late tobacco in Anne Arundel and St. Marys Counties. (U. Md., Ent. Dept.). VIRGINIA - Infestations generally increasing in Pittsylvania County. (Dominick).

GREEN JUNE BEETLE (Cotinis nitida) - MARYLAND - Adults numerous in tobacco fields in St. Marys County. (U. Md., Ent. Dept.).

GRASSHOPPERS - VIRGINIA - Damage general and medium in Washington County. (Gorsline).

STINK BUGS - VIRGINIA - Damaging tobacco generally over Lee County. (Lyle, Rowell). Euschistus euschistoides damaging top leaves of tobacco in Lunenburg County. Leaves dying after attack. (Hardin).

COTTON INSECTS

BOLL WEEVIL (Anthonomus grandis) - NORTH CAROLINA - Beginning to show up in large numbers in most sections. (Cott. News Lett.). SOUTH CAROLINA - General migration in Florence area. Practically all growers ceasing insecticide applications. (Walker et al.). TENNESSEE - Forty percent infested squares in west Tennessee but squares scarce and weevils migrating to younger cotton. (Locke). GEORGIA - No square counts in south Georgia due to scarcity of squares but large numbers of weevils present and damaging young bolls. Migration underway for several days. (Johnson). MISSISSIPPI - Infestation of 16.8 percent in 53 fields north of Leland although square counts not reliable due to stage of cotton. (Merkl et al.). LOUISIANA - Examinations in 90 fields in Tallulah area showed all infested at rate of 34 percent compared with 28 percent two weeks ago. Overall infestation continues to increase. Locally, migration occurring. (Pfrimmer et al.). Ten fields in Concordia Parish had 25 percent infestation and 5 in Ouachita had 49 percent. Migration occurring all areas. (Oliver). Seven of 9 fields in Tensas Parish had 91-96 percent infestation. (Clower). ALABAMA - Thirty-nine fields checked in 9 central counties and all found infested at rate of 48 percent. (Tyus). ARKANSAS - Lack of squares resulted in high infestation counts in many fields. In general, infestations have increased markedly except in southeast and where second-generation emergence occurred earlier. Percent infestation by area this week and last: southeast 20.9 and 18, east central 22 and 9.7, northeast 21.2 and 14.9, central 30.7 and 25.4, southwest 43.3 and 31.1. (Warren, Harrendorf, Barnes). TEXAS - Infestations continue generally light with only isolated heavy infestations, usually in irrigated cotton. (Turney, Martin). Average of 18.6 percent punctured squares in 10 treated fields in McLennan and Falls Counties. (Parencia et al.). OKLAHOMA - Infestations continued high in Caddo, Hughes and Pittsburg Counties. Two fields in Caddo County had 100 percent infestation. (Flora).

BOLLWORMS (Heliothis spp. et al.) - SOUTH CAROLINA - Considerable moth activity in cotton fields in Florence area. (Walker et al.). GEORGIA - Heavy in 12 counties, moderate in 3 and light in 2. (Johnson). ALABAMA - Two percent infestation in 9 central counties. (Tyus). TENNESSEE - Increasing over western area and control needed in many fields. (Locke). ARKANSAS - Increasing in succulent cotton. (Warren, Harrendorf, Barnes). MISSISSIPPI - Still low in delta counties. (Merkl et al.). LOUISIANA - Examinations in 90 fields in Tallulah area showed all infested at rate of 6.1 eggs per 100 terminals. Larvae found in 89 fields at rate of 2.6 per 100 terminals. (Pfrimmer et al.). Three to 7 larvae and eggs per 100 terminals in some parishes;

but some decline. Very heavy moth activity continues in some areas. (Oliver). TEXAS - Continue main problem in north and south plains, south central and central areas. (Turney, Martin). Decrease in eggs at Waco. Five eggs and 5.6 larvae per 100 terminals in 19 fields. (Parencia et al.). OKLAHOMA - Moderate to light in most counties. High egg counts in Greer, Jackson and Tillman Counties. (Flora). ARIZONA - Increasing in uncontrolled south central and southeastern areas; 0-18 per 100 terminals in Pima, Pinal and Maricopa Counties. (Ariz. Coop. Rept.). MISSOURI - Eggs increasing. Larvae increased also in most areas. Eighty-five percent of 462 fields showed larval infestation of 1-18 per 100 plants. Heavy moth flight continued. (Kyd, Thomas).

PINK BOLLWORM (Pectinophora gossypiella) - TEXAS - About 10 percent damage in one cotton field in Refugio County. Infesting 16 percent of bolls in 8 fields in Brazos County. (Turney, Martin). OKLAHOMA - Bloom inspection in McCurtain and Leflore Counties showed no pink bollworm. (PBW Cont. Proj.).

COTTON LEAFWORM (Alabama argillacea) - ARKANSAS - Infestations in several counties. (Warren, Harrendorf, Barnes). OKLAHOMA - A few in Pittsburg County. (Bryan).

BROWN COTTON LEAFWORM (Acontia dacia) - TEXAS - Considerable "ragging" of cotton in untreated fields in south central area. (Turney, Martin). ARKANSAS - Adults in southwest but larvae have not appeared. (Warren, Harrendorf, Barnes).

CABBAGE LOOPERS - TEXAS - Reported "ragging" cotton leaves in many fields in most areas with heaviest damage in irrigated cotton. (Turney, Martin). OKLAHOMA - General in many fields in Greer and Tillman Counties, from 1 to as high as 35 per plant. (Flora). SOUTH CAROLINA - Damage warrants controls in Dillon County (August 2). (Nettles). ARIZONA - Trichoplusia ni building up in some fields in Pinal County. Six to 10 per 100 sweeps at Gilbert, Higley and Chandler. (Ariz. Coop. Rept.). ARKANSAS - Infestations in several areas. (Warren, Harrendorf, Barnes).

APHIDS - LOUISIANA - Building up in many fields, Tallulah area. Injurious infestation in some fields. (Pfrimmer et al.). One heavy damaging infestation in Red River Parish. (Oliver). GEORGIA - Aphis gossypii heavy in Macon County, moderate in Terrell and light in Dougherty, Tift and Coffee Counties. (Johnson). TENNESSEE - Light in west Tennessee. (Locke). ARKANSAS - Increasing. Poor control some cases. (Warren, Harrendorf, Barnes).

SPIDER MITES - NORTH CAROLINA - Widely reported but most fields show only spotted damage. (Cott. News Lett.). GEORGIA - Heavy in Sumter County, moderate in Macon and light in Terrell, Worth and Berrien Counties. (Johnson). ALABAMA - Damaging numbers on cotton in northern counties. (Arant). LOUISIANA - Present in many fields in Tallulah area. (Pfrimmer et al.). Heavy in St. Landry Parish.

(Oliver). MISSOURI - Continue to increase. Infestations range from small spots to uniform infestations over field. Heaviest damage in New Madrid County where considerable defoliation has occurred. (Kyd, Thomas). ARKANSAS - Increasing with poor control in some areas. (Warren, Harrendorf, Barnes). ARIZONA - Severe on 20 acres near Gilbert and 40 acres at Tempe. (Ariz. Coop. Rept.).

A THRIPS (Frankliniella gossypiana) - ARIZONA - A thrips associated with blasting of small squares at Casa Grande, May 21, and Marana, June 4, has been identified by K. O'Neill as this species. As far as known, first report of this thrips from Arizona cotton since 1913. (Ariz. Coop. Rept.).

COTTON LEAF PERFORATOR (Bucculatrix thurberiella) - ARIZONA - Threatening in parts of Pinal County, Aug. 3. Seventy acres of stub cotton severely damaged in Yuma County. From 30-32 per 100 sweeps in Maricopa County, considerable leaf damage. (Ariz. Coop. Rept.).

LYGUS BUGS - TEXAS - Continue to increase in south plains area. (Turney, Martin). ARIZONA - High in all areas, 25-110 per 100 sweeps. Intensive control measures. (Ariz. Coop. Rept.).

FLEAHOPPERS - OKLAHOMA - Severe in some fields in Caddo and Greer Counties. (Flora).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

A PINE LEAF APHID (Pineus pinifoliae) - MAINE - Caused abundant and exceptional browning of 1955 tips of white pines over a good part of State. Growth output retarded in many trees. (Me. For. Ins. Notes, July). NEW YORK - Injury and mortality to white pine. (N. E. For. Pest Reptr.). VERMONT - Two young plantations at 1400 and 1700 feet altitude were total loss. (N. E. For. Pest Reptr.).

WHITE-PINE APHID (Cinara strobi) - VERMONT - Caused considerable flagging and mortality to young white pine. (N. E. For. Pest Reptr.).

BALSAM TWIG APHID (Mindarus abietinus) - MAINE - Very abundant and causing curling and twisting of current growth which could seriously affect Christmas tree stock. Also like situation in New Hampshire and Vermont. (N. E. For. Pest Reptr.).

MOUNTAIN PINE BEETLE (Dendroctonus monticolae) - WYOMING - Epidemic or near-epidemic conditions in lodgepole pines in the Wapiti District of the Shoshone National Forest and in the South Fork District an infestation is increasing and threatening adjacent lodgepole pine stands. (Ostmark).

BLACK-HEADED BUDWORM (Acleris variana) - MAINE - General increase. Light infestations over much of area from Allagash to

Madwaska Lake and south to Island Falls. (Me. For. Ins. Notes, July).

AN OAK TWIG PRUNER (Hypermallus villosus) - NEW YORK - Heavily infesting oaks in parts of Catskill Mountain area and in Letchworth Park, Wyoming and Livingston Counties. (N. E. For. Pest Reptr.).

A BEETLE (Conophthorus sp.) - MAINE - Has practically eliminated white pine cone crop at Alfred. (N. E. For. Pest Reptr.). MARYLAND - Practically eliminated pine cone crop in Montgomery and Howard Counties. (N. E. For. Pest Reptr.).

SUGAR-MAPLE BORER (Glycobius speciosus) - PENNSYLVANIA - Damage severe in Elk and McKean Counties. Up to 50 percent of hard maples attacked. (N. E. For. Pest Reptr.).

SATIN MOTH (Stilpnotia salicis) - NEW YORK - Appears to be increasing with medium heavy populations on cottonwoods in Saratoga, Albany and Herkimer Counties. (N. E. For. Pest Reptr.).

POPLAR TENT MAKER (Ichthyura inclusa) - DELAWARE - Defoliating aspen, willow and poplars throughout State. (Milliron).

BROWN-TAIL MOTH (Nygmia phaeorrhoea) - MAINE - Small local infestations sprayed with ground equipment in New Gloucester, Poland and Wiscasset. (Me. For. Ins. Notes, July).

A SAWFLY (Neodiprion pratti) - NEW JERSEY - Causing extensive damage to pitch pine in southern area and defoliating many shortleaf pines and occasional loblolly, jack and ponderosa pine. (N. E. For. Pest Reptr.). NEW YORK - Light infestation on pitch pine in Warren, Albany and Rensselaer Counties. (N. E. For. Pest. Reptr.).

BARK BEETLES - VIRGINIA - Severely damaging shortleaf pines in Warwick, some pines dying. (Sedivy). TEXAS - Ips spp. killing individual pines in Montgomery, Walker, San Jacinto, Liberty and Hardin Counties and groups of pines near pines struck by lightning. Dendroctonus sp. causing mortality in recently-logged area in northern Hardin County. (Young). WYOMING - Scolytus tsugae attacking Douglas-fir in Wapiti District of Shoshone National Forest. (Ostmark).

FALL WEBWORM (Hyphantria cunea) - RHODE ISLAND - Feeding generally on roadside deciduous trees and unsprayed fruit trees. (Steve). WISCONSIN - Heavy in eastern Langlade County and occurring in Vilas, Lincoln and Oneida Counties. (Wis. Ins. Bul.). SOUTH DAKOTA - Infestations in over 75 percent of chokecherries some areas of Black Hills. (Hantsbarger).

FALL CANKERWORM (Alsophila pometaria) - MAINE - Two local outbreaks on 50-75 acres in Franklin and about 1000 acres in Warren. (Me. For. Ins. Notes, July).

GYPSY MOTH (Porthetria dispar) - MAINE - Generally low ebb, with only 150 acres warranting spraying in Wells and Alfred. (Me. For. Ins. Notes, July).

LARCH SAWFLY (Pristiphora erichsonii) - WISCONSIN - Defoliation heavy in many stands over northern third of State. (Wis. Ins. Bul.).

DOUGLAS-FIR TUSSOCK MOTH (Hemerocampa pseudotsugata) - IDAHO - Rather heavy infestation in Owyhee County. Damage to some trees quite severe. (Sampson).

SPRUCE BUDWORM (Choristoneura fumiferana) - MAINE - Definite increase in eastern area of northern part of State and a decrease in western part of northern area. Infestations generally light. (Me. For. Serv. Ins. Notes, July). IDAHO - Heavy damage to current growth of grand fir in Waha Lake and Soldiers Reservoir areas south of Lewiston. (Barr, Clark).

EUROPEAN SPRUCE SAWFLY (Diprion hercyniae) - MASSACHUSETTS Severe outbreak on 600 acres in Orleans treated with good control. (N. E. For. Pest Reptr.).

EUROPEAN PINE SAWFLY (Neodiprion sertifer) - NEW YORK - Causing considerable stripping of red pine in plantations in Weschester County. (N. E. For. Pest Reptr.).

ELM LEAF APHID (Myzocallis ulmifolii) - MAINE - Very abundant on American elms at Orono. (Simpson).

WOOLLY ALDER APHID (Prociphilus tessellatus) - NEW HAMPSHIRE Heavily infesting cut-leaf maples. (N. E. For. Pest. Reptr.).

AZALEA LACE BUG (Stephanitis pyrioides) - ALABAMA - Causing severe damage to azaleas in Lee County. (Arant).

SYCAMORE TUSSOCK MOTH (Halisidota harrisii) - DELAWARE - Very numerous and destructive Smyrna area. (Milliron).

LOCUST LEAF MINER (Chalepus dorsalis) - VIRGINIA - Heavy damage to black locust over State. (Morris).

DOGWOOD TWIG BORER (Oberea tripunctata) - WEST VIRGINIA - Damaging dogwood in Monongalia County. (Dorsey, Hansen).

COTTONWOOD LEAF MINERS - UTAH - Damaging cottonwoods along Sevier River. Some injury to poplars in San Juan County. (Knowlton).

COTTONY MAPLE SCALE (Pulvinaria innumerabilis) - IDAHO - Scattered severe infestations on maples in Gooding County. Many trees with considerable yellowing of foliage. (Gittins).

NORWAY-MAPLE APHID (Periphyllus lyropictus) - MAINE - Heavy infestation with some leaf drop of Norway maples at Vanceboro, Ilesford and Old Orchard Beach. (Simpson). UTAH - Severe on maple trees in Logan area. (Knowlton).

MOURNING-CLOAK BUTTERFLY (Nymphalis antiopa) - SOUTH DAKOTA - Reported from several areas as feeding on American elm. (Lofgren).

ELM LEAF BEETLE (Galerucella xanthomelaena) - IDAHO - Skeletonizing foliage on elms in Hammett, King Hill and Glens Ferry. Larvae very abundant. (Scott, Gittins).

YELLOW-NECKED CATERPILLAR (Datana ministra) - DELAWARE - More destructive than for past several years. Severity of attack on oaks and ornamentals increasing throughout State. (Milliron).

BAGWORM (Thyridopteryx ephemeraeformis) - DELAWARE - More abundant statewide than last season. Defoliating many coniferous and deciduous trees and shrubs. (Milliron). VIRGINIA - Damaging shrubs in Greenville and several other counties. (Rowell et al.). GEORGIA - Heavy infestation on arborvitae and other ornamentals in Jasper and Baldwin Counties. (Milner, Aug. 1).

BIRCH LEAF MINER (Fenusa pusilla) - MAINE - Causing abundant browning of birch leaves. (Me. For. Ins. Notes, July).

SPIDER MITES - WISCONSIN - An infestation, probably Tetranychus telarius heavy on red pine in Sawyer County. (Wis. Ins. Bul.). VIRGINIA - Heavy on boxwoods in New Kent and King and Queen Counties. (Rowell).

JAPANESE BEETLE (Popillia japonica) - OHIO - Increasing many sections of State. (C. R. Neiswander). NORTH CAROLINA - Severe in West Jefferson and surrounding area on ornamentals but few in rural areas. (Gardner).

A BARBERRY LEAFWORM (Coryphista meadii) - DELAWARE - Causing much concern on various kinds of barberry in nursery near Milford. First authentic State record. (Milliron).

INSECTS AFFECTING MAN AND ANIMALS

SCREW-WORM (Callitroga hominivorax) - OKLAHOMA - Isolated infestation in navels of newly-born calves in western counties. (Coppock).

HORN FLY (Siphona irritans) - OKLAHOMA - Averaged about 400 per cow in western and panhandle counties. (Coppock).

MOSQUITOES - UTAH - Serious problem at Springville. (Knowlton). RHODE ISLAND - *Aedes vexans* abundant and annoying in Matunuck. Biting rate 12 per minute. (Steve).

TABANIDS - RHODE ISLAND - *Chrysops* spp. continue abundant. (Steve).

DOG FLEA (*Ctenocephalides canis*) - ALABAMA - Locally abundant in several parts of State. (Arant).

MIDGES (*Chaoborus* spp.) - RHODE ISLAND - Swarming in great numbers in Cranston. (Mathewson).

BENEFICIAL INSECTS

A PARASITE (*Apanteles congregatus*) - DELAWARE - Destroyed at least 50 percent of *Protoparce* larvae on tomatoes at Canterbury. (Milliron).

DAMSEL BUGS (*Nabis* spp.) - SOUTH DAKOTA - Found frequently in alfalfa fields of western area. Populations average seven per 10 sweeps. (Hantsbarger).

CORRECTIONS

CEIR 6(21):472-MEDITERRANEAN FRUIT FLY (*Ceratitis capitata*) world distribution map. Bolivia was omitted from areas of infestation. (Christenson).

CEIR 6(31):768- TABANIDS- RHODE ISLAND . Should read (*Chrysops* spp.).

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WEATHER FOR THE WEEK ENDING August 13, 1956

A shifting in the circulation pattern brought about more normal summertime conditions to the East, where for the first week in almost 2 months temperatures averaged slightly above normal in the Northeast and northern Great Lakes region. For the first time this season Atlantic coastal inhabitants have been intently watching the path of a hurricane. Relatively small in size but accompanied with winds of approximately 120 m.p.h., near the center, hurricane "Betsy" crossing the West Indies since Friday, left much destruction behind, and took at least 1 life in Puerto Rico, and is now located about 260 miles east of Miami moving northwestward. Hot weather prevailed over most of the South and weekly temperatures averaged 3° or more above normal from New Mexico eastward as Georgia, northern Florida, and Oklahoma reported their hottest days of the year. Weekly departures were above normal by 6° in parts of Oklahoma and Kansas. The coolest weather of the week occurred over northern Rocky Mountain Region with the greatest minus departure, 6°, reported at Billings, Mont. At higher elevations in Colorado freezing temperatures were observed on some days. Weekly precipitation amounts were moderate to heavy over most of South Dakota, in the upper Mississippi Valley, closely surrounding the Great Lakes, along the Gulf Coast from New Orleans, La., to Tampa, Fla., and other scattered locations; while west of the Continental Divide, over most of Texas, and in a band about 150 miles wide from Montgomery, Ala., to the Ohio Valley little rain of consequence fell. The most noteworthy storm reported this week was one which struck the Crosby-Ironton, Minn. area on Sunday afternoon. Accompanied by hurricane force winds and flooding rain, it was described as the worst to hit that area since 1915. Damage was estimated at over $1,000,000 as trees were uprooted, crushing cars and house roofs; winds caused destruction to at least 3 business establishments and some communication services were disrupted for several days. Throughout the country other local storms of wind and hail were reported but with less severe destruction. (Summary supplied by U. S. Weather Bureau).

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ADDITIONAL NOTES

NEW YORK - ORCHARD MITES building up in Columbia County but under control and TWO-SPOTTED SPIDER MITE increasing in some orchards in Niagara County. EUROPEAN CORN BORER approaching peak in Hudson Valley. APHIDS troublesome on corn husks some fields in Hudson Valley. CABBAGE LOOPER increasing on Long Island. CORN EARWORM counts high in some corn fields on Long Island. (N.Y. Wkly. Rept.).

IOWA - EUROPEAN CORN BORER varies greatly in abundance and development. At Ankeny, second-brood emergence about 60 percent with 80 eggs masses per 100 plants, August 10. Some hatching in central area. Moths continue heavy over most of State. GRASSHOPPERS continue troublesome some areas where not previously controlled and remain abnormally abundant although damage lessened by green vegetation. (Harris).

MAINE - AN OAK TWIG PRUNER much more abundant, mostly on oaks, in central areas. (Me. Agric. Exp. Sta.).

LIGHT TRAP COLLECTIONS	Pseud.	Agrotis	Prod.	Perid.	Feltia	Heliothis		Protoparce		Laphyg.
	unipun.	ypsilon	ornith.	marg.	subt.	zea	vires.	sexta	quinq.	frugip.
COLORADO (County)										
Otero 8/3-5						146				
NEBRASKA (Counties)										
Lincoln 7/29-8/5									13	
Lancaster 7/29-8/4						4		10		
SOUTH DAKOTA (County)										
Brookings 8/7-9	76	5								
MINNESOTA										
St. Paul 8/6&7	15	5		2						
INDIANA (Counties)										
Lawrence 8/2-8	405	4	42	5				37	12	
Tippecanoe 8/3-9	2	1	2					1		
OHIO (County)										
Athens 7/30-8/5	32	3								
ILLINOIS										
Urbana 8/3-9	142	48	87	10		66		26		
MARYLAND (County)										
Montgomery 8/1-9	15	7		1		11		16	8	2
VIRGINIA (County)										
Pittsylvania 7/30-8/4								379	1372	
NORTH CAROLINA (Counties)										
Johnston 8/8-9	15	5	32		5	94	3	16	5	
Duplin 8/8-9	27	2	29			130	12	3	6	4
SOUTH CAROLINA (Counties)										
Charleston 7/23/29	2		21		7	39		6		11
Florence 7/28-8/3	754	24	250	10	220	7923	556	50		78
Oconee 7/29-8/4	464	21	143		16	175	1	10	2	
GEORGIA (Counties)										
Clarke 8/2-8/8	27	54				20	10	11	7	
Spalding 8/3-9	356	103	202	3	29	1868	7	8	1	94
Tift 8/3-9	622	45	312		297	3230	25	21	4	333
ALABAMA (Counties)										
DeKalb 8/6	7		6			150		1	9	3
Lee 8/4-10	543		324			1974	40	11	9	870
MISSISSIPPI (Counties)										
Humphreys 8/4-10	44	6	60		82	402	11			
Lauderdale	14	1	19		41	76	3			
Marshall	16		8		5	80				
Oktibbeha	713	37	95	1	57	575	11			24
*Washington 8/3-9	394	72		4		1500				29
LOUISIANA										
*Tallulah 8/3 5	141	10	58	3	135	449	34	26	3	42
Curtis 7/30-8/6	14		7		9	3750		12		
Baton Rouge 8/4-10	26	3	17		39	80		5		361
TEXAS										
Winter Haven 7/16-31	1	2	5	3		162	6			8
Waco 8/4-10	17	7	14	18	18	2683	6			
TENNESSEE (Counties)										
Madison 7/30-8/6	294	16	36			920		5		
Lawrence	156	12	88			64		34	41	
Maury	108	8	112			56		27	39	
Robertson	380	16	124			240		46	95	
Cumberland	377	28	84			22		22	5	
Knox	144	12	146			84		2	2	
Greene	285	32	104			12		81	79	
Blount	156	4	56			8		3	2	
MISSOURI (Counties)										
Boone 8/4-10	27	2		3		82		84		69
Scott 8/6, 7&9						4713		59		
ARKANSAS										
Hope 8/3-9		4				85				
Stuttgart 8/2-8	5	4		4		24				
Van Buren 8/2-8						45				
Fayetteville 8/4-10	32	10		2		845				
Clarksville 7/19-7/31	28	30		1		42				
KANSAS										
Wathena 8/2-8	5	7	22			87		46	41	
Manhattan 8/5								36	16	

*Two traps Washington County; three traps Tallulah.

UNIFORM SURVEY PROCEDURE APPROVED BY THE LAKE STATES FOREST INSECT SURVEY COMMITTEE - 1956

FOREST TENT CATERPILLAR APPRAISAL SURVEYS

PURPOSE:

The forest tent caterpillar has been a vigorous defoliator of aspen and other broadleafed trees throughout hardwood forest areas of the Lake States. While defoliation resulting from periodic caterpillar outbreaks is spectacular in nature, the amount of mortality caused to susceptible host trees generally is not enough to warrant the initiation of large scale chemical control. However, the ever-increasing value of forested areas for wild life and recreational purposes magnifies the seriousness of such infestations. The presence of thousands of caterpillar larvae becomes a real nuisance to inhabitants of affected areas. Direct monetary loss to the resort and tourist industries was sufficient to warrant an action program in most wooded areas in Minnesota from 1950 through 1955.

Predicting the location and severity of infestations and recommending subsequent control measures must be based upon a sound appraisal of infestations. The coordinated efforts of all state, federal, civic, and commercial groups concerned with the caterpillar are necessary for maximum effectiveness. Because infestations may become widespread in distribution, vast savings can be made by utilizing foresters or other personnel already stationed in the field to collect and report survey data. The procedures discussed here will provide sufficient data to predict accurately the status of infestations for use in recommending control. They may furnish others with the facts and procedures necessary for an understanding of the behavior and characteristics of forest tent caterpillar. These procedures have been substantiated by research and were used successfully during the recent outbreak in Minnesota. The four main procedures that were used annually in order to measure populations are:

A. Defoliation surveys.--Determining degree and extent of defoliation.

B. Cocoon surveys.--Determining density of cocoon populations.

C. Egg mass surveys.--Determining abundance of egg masses.

D. Seasonal development surveys.--Time of hatching, time of maximum control effectiveness.

The following life history table covers each stage as it is likely to occur under Minnesota conditions.

Eggs:	Hatch April 15-May 15
Larvae:	April 15-June 15
Pupae:	June 15-July 10
Adult:	June 25-July 20

A. Surveys to determine degree and extent of defoliation

A rapid and useful picture of the current overall distribution of forest tent caterpillar can be made at a time when the insect or its consequences are most conspicuous. Besides delimiting the infestation, the relative population levels throughout an infested area can be determined by measuring specific degrees of defoliation. Generally both aerial and ground procedures are necessary in order to gain a complete picture. This does not, however, provide sufficient information for use in predicting the trend of infestations because the effects of starvation and parasitism are not apparent as a result of such surveys. Reconnaissance should be made after larval feeding has passed its peak, but before refoliation of the stripped trees becomes evident. Where large forest expanses are involved, north-south differences in development may make it necessary to stagger dates of observation.

1. Ground reconnaissance

Estimates of specific defoliation levels can be determined more accurately by ground rather than from aerial observations. A measure of the relative abundance of caterpillar populations can be made by recording the condition of host trees at locations scattered throughout an infested area. In the fall the amount of actual feeding that occurred the past summer can be more closely related to the probable larval population if defoliation records are taken at the same locations where egg mass counts were made the previous fall. This also provides some indication of the amount of larval mortality that occurred during hatching and early instars.

So that the degree of defoliation may be quickly assessed over thousands or millions of infested acres, non-technical personnel already stationed in the field are requested to report conditions in their immediate area. A simple survey form for estimating and reporting defoliation is shown below. When completed forms are received, the information is transferred to a large map, using convenient symbols to show the defoliation level at each location.

FOREST TENT CATERPILLAR
DEFOLIATION REPORT

INSTRUCTIONS FOR COMPILING

Designation

Heavy:	From complete stripping of all broadleafed trees and brush (except red maple and sumac which are not fed upon) to complete defoliation of aspen or oak with conspicuous feeding damage on birch and brush.
Moderate:	Occasional aspen and oak completely stripped, most aspen and oak with tops thin; little feeding on birch or brush.
Light:	No trees showing complete defoliation. Feeding damage confined to top of the aspen and oak crowns. Little or no feeding on other tree or brush species.
None:	No leaves removed from crown of any tree species. Terminal branches with normal foliage (caterpillars may be present in small numbers, but no conspicuous signs of feeding).

Note: Do not allow presence or absence of larvae to influence defoliation estimates. The purpose of this survey is to relate actual feeding damage to egg mass abundance data which you collected last fall. Please use separate sheet for each locality. A prompt estimate of defoliation and return of this form will be appreciated because this information is necessary for planning an aerial survey.

Date____________________

Forest____________________ District______________________ Observer____________________

Locality Amount of defoliation

S.________ T.________ R.________ ____

Comments:____

____

____

____

2. Aerial reconnaissance

Aerial observations are used to map the overall distribution of caterpillar by delimiting areas of defoliation and noting comparative severity. The fine degrees of defoliation used in ground reconnaissance cannot be determined accurately from the air, unless frequent re-checks are made to study locations with known degrees of defoliation. Generally only two main categories of defoliation level are necessary for aerial reconnaissance.

HEAVY -- Areas where most of the trees show complete stripping of leaves, same as heavy on ground survey report form.

PARTIAL -- Areas where defoliation is noticeable, but trees are not completely stripped of leaves. Combining light and moderate defoliation levels.

The procedure used to map defoliation is as follows:

1. Using Regional navigational maps, or others, that show good landmark points, draw flight lines at 6-or 12 mile intervals covering the infested area. Mark three maps, one for pilot, and one for each observer.

2. The flight intervals and altitude are dependent on two sets of conditions.

   a. Where heavy defoliation appears to be general over a large area, fly 12-mile intervals as an altitude of 1, 500 feet, and observers can usually note conditions for about 6 miles on either side of the plant.

   b. Where spotty or partial defoliation occurs fly 6-mile intervals at an altitude of 1, 000 feet and observers can determine conditions for 3 miles on either side of the plane.

3. Using a plane that will accommodate the pilot and two observers, systematically follow flight lines on the previously marked maps.

4. Note the general condition of broadleafed trees over each mile of territory covered, continually checking landmarks so that the position is always known.

5. Mark observed levels of defoliation on the corresponding position of the flight maps. Suggested colors for marking are:

   RED - To denote heavy defoliation.
   BLUE - To denote partial defoliation.

   Shading colors may be desirable wnere defoliation is extremely variable or if borderline conditions make determinations difficult. Where operation recorders are available they may be used to continuous strip sampling in lieu of area coloring as described above.

B. Cocoon survey

Knowledge of the abundance and condition of forest tent caterpillar cocoons is a useful index of the surviving caterpillar population. It also measures the extent of the late larval and cocoon parasitism (principally by Sarcophaga aldrichi), which may help to terminate the outbreak. Such information can be gained by counting the numbers of collected cocoons in a given time and then examining them for signs of parasitism or other destruction. It is suggested that collections be made at locations where egg mass counts and defoliation estimates were previously made in order to tie in the entire picture of caterpillar progress. Adequate coverage, by selecting these sampling stations based on an area-wide infestation, will yield a balanced picture of parasitism.

The cocoon survey can be made in the selected aspen or hardwood type stands after most of the moths have emerged. Again, because of the large area to be covered, nontechnical personnel can make the actual collections in the field and send them to a central laboratory for examination. A sample request, outlining the procedure used, is shown here.

FOREST TENT CATERPILLAR COCOON SURVEY

Attached are locality descriptions of your area which correspond to roadside locations at or near which we would like to have cocoon collections made. The selection of these sampling stations is based upon the state-wide infestation, and is intended to yield a balanced picture of parasitism in the entire area. Try to make your collections as near as possible to the sites where egg collections and defoliation estimates were made.

We are interested in both time and quantity cocoon collections. It is requested that the collector first make a three-minute collection of cocoons on the brush, beginning at a point 5 to 10 yards from the forest edge. We would prefer that this collection be made over a distance of at least 1 chain (66ft.) rather than confining all collecting to one or several branches or bushes. This is best accomplished if the collector maintains a moderate walking speed throughout the three-minute collecting period. At the end of the three-minute period, the observer should make an estimate of the number of cocoons that he has collected. Should he have fewer than 15 cocoons, it is requested that he collect for an additional 1, 2, or 3 three-minute interval up to a maximum of 12 minutes, in order to increase the size of the sample. The collection should be placed in a paper bag with the exact location and the duration of the collection time marked thereon. It is important to have both the legal description of the collection site and the length of the collecting time clearly marked on the paper bag.

The collection should be made after most of the moths have emerged. In some cases, no cocoons will be found after prolonged searching. Where this occurs, please indicate the location, time spent collecting, and the fact that no cocoons were found.

The following criteria can be used to determine the condition of cocoons:

1. Normal healthy moths emerged from silken cocoons that appear light yellow brown around the exit hole. The pupal skins within are usually dry and fragile.

2. Parasitized cocoons show dark staining around one end, and the pupal skin is greasy and tougher in texture.

The number of cocoons per unit area of ground vegetation varies greatly with (1) the size of the caterpillar population, (2) the degree of defoliation, and (3) the amount of caterpillar wandering. The vertical positioning of cocoons usually reflects the level of defoliation. For example, where light to moderate defoliation has occurred, most of the cocoons will be found in leaves of deciduous trees. Where complete defoliation has occurred the cocoons will all be found on ground vegetation, such as bracken fern and others, and there will be few, if any, in deciduous trees, excepting red maple. Principal chances for error in collecting cocoons on brush occur when populations are very large or extremely small and when the brush is irregular and not uniformly spaced. As an example, where 70 or more cocoons are found per square meter the collector cannot pick fast enough to indicate the difference between 50 or 80. However, such large numbers indicate extremely high populations and for practical purposes the differences do not matter.

In spite of these limitations, this survey provides useful information such as: (1) an accurate representation of successful moth emergence, and (2) how parasitism is progressing. Until 90 percent or more cocoons are affected, parasitism is seldom of major importance except where populations have been drastically reduced by starvation.

C. Egg mass survey

An egg mass survey is the most important measurement for predicting the area and intensity of the subsequent year's infestation. Eggs representing reproductive efforts of currently emerged moths are final indicators of the probable caterpillar population and subsequent level of defoliation. In order to determine these predictions, it is necessary to know how many viable eggs are present on individual trees throughout the area. Embryos are well developed within the eggs by early fall, and parasitized or diseased eggs can be distinguished readily in late fall.

1. Procedure for collecting egg masses

To accomplish this survey, requests can again be sent to cooperators in the field.

FOREST TENT CATERPILLAR
EGG MASS COLLECTION

1. Cut representative aspen trees within a 1/5-acre area at the location selected. The trees should be typical of the stand, particularly with respect to crown size.

2. Examine the twigs of each crown carefully for the presence of tent caterpillar egg masses.

3. Collect all egg masses (whether old or new) from each tree and place in a separate container (paper bag, box, etc.). Identify each tree collection with Section, Township, and Range designations. The three collections from each station should then be placed in a single container and suitably marked.

4. Clearly mark on each bag containing egg masses, the d. b. h. of tree which was sampled.

A sequential sampling system for egg mass surveys has not been worked out for conditions in this region, although it is felt that such a system could be developed. To avoid cutting trees, other methods, such as estimating the number of egg masses with binoculars, have been tried. The results were inaccurate. Nevertheless, in parks, cities, and communities where cutting cannot be used, estimates will have to be made on small trees or with the use of binoculars.

2. Predicting probable caterpillar populations and subsequent level of defoliation

For accurate predicting of caterpillar populations it is necessary to anticipate the number of living larvae per tree fairly accurately; correlate these figures with the amount of foliage each larva can consume and with the number of leaves present. The size of trees, amount of foliage, and the number of stems per acre will greatly influence interpretation of egg mass counts. In addition , there may be extreme variation of counts from tree to tree within a stand. However, sufficient sampling will show an average or trend throughout the area.

The following categories are used to relate egg mass abundance to the amount of defoliation expected.

Average number of masses per tree	Expected level of defoliation
0 - 4	Light
5 - 9	Moderate
10 - 14	Moderate to heavy
15 - more	Heavy to complete

The basis for these categories, as well as a more complete discussion on egg mass collections and prediction methods, is given in the University Agricultural Experiment Station Technical Bulletin 148 by A. C. Hodson.

When egg mass counts are assembled, mapped, and expressed as defoliation potential, a prediction map is drawn and duplicated for distribution to all interested groups or individuals. This will enable those in any given area of the state to anticipate the extent of caterpillar infestation for the ensuing year.

A high percent of egg, or embryonic, mortality during late fall and winter can greatly reduce the seriousness of infestation. The amount of mortality can be determined during April by carefully slicing the tops from three rows of eggs on opposite sides of a mass and then counting the number of healthy and the number of dead or diseased eggs. Sixty egg masses picked at random from any one site will give a reliable figure.

D. Survey to determine time of egg hatching

In a situation where commercial operators must be relied upon to make contact with resort owners and municipalities who wish to control forest tent caterpillars, it may be necessary to publicize the appropriate time for applying chemicals and insecticides. Since the later stages of the forest tent caterpillar epidemic covered a vast area and the seasonal variation was considerable, it was particularly valuable to have timely reports of development from all over the infested area.

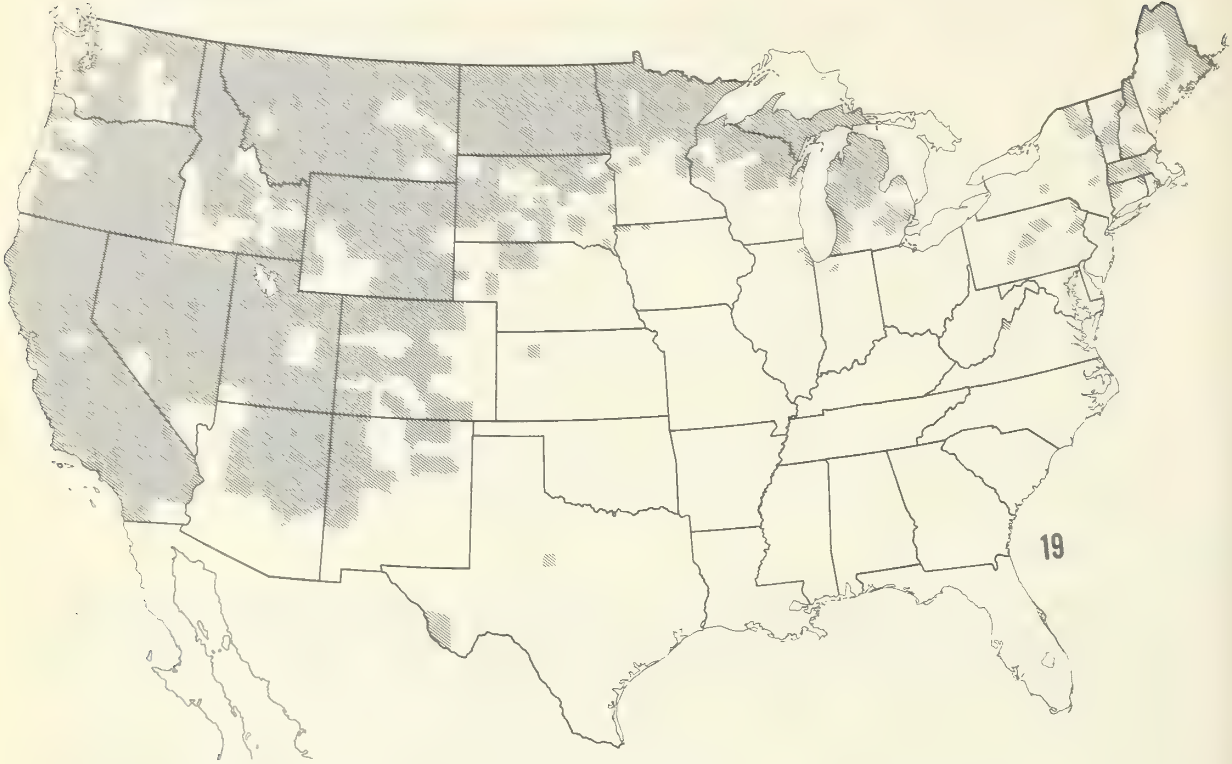
Entomologists must be in field at least 2 weeks prior to egg hatching. In addition, forester observers, who are distributed over the entire forested area, may submit reports of phenological phenomena that preceded caterpillar hatching. A supply of self-addressed post cards was mailed to each observer and he was requested to check each of 22 phenomena as they occurred and send the post card at the time of checking. As a result, each observer mailed some 22 post cards to the coordinating office. When cards from all over the state were tabulated, a reasonably good picture of seasonal variations was apparent.

Timely news releases, based on the reports of entomologists and cooperators, were prepared prior to and during the control period. In addition to circular letters, the newspapers, radio, and television were also employed where they could best serve to inform the public. In this way, both commercial spray operators and property owners depending on effective control were given necessary assistance.

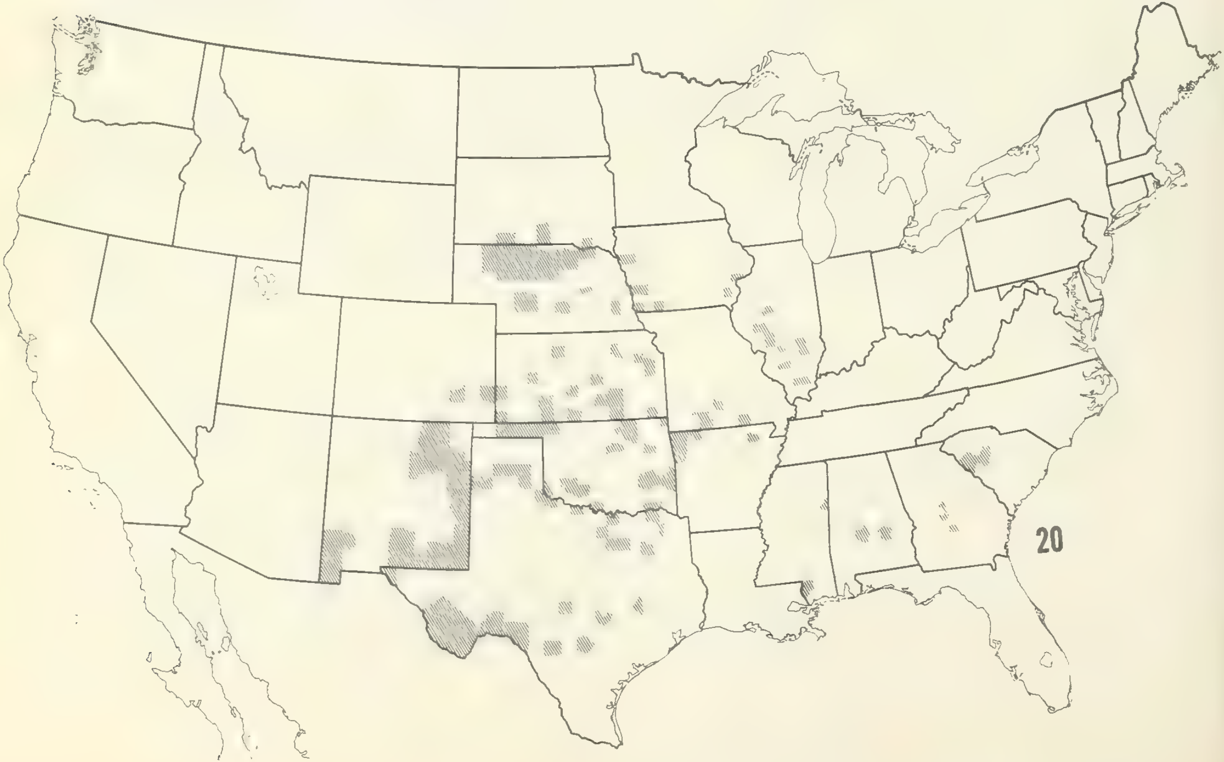
J. W. Butcher, Minnesota State Entomology Dept. and A. C. Hodson, University of Minnesota.

DISTRIBUTION OF RANGE GRASSHOPPERS

Camnula pellucida (Scudder)· clear-winged grasshopper



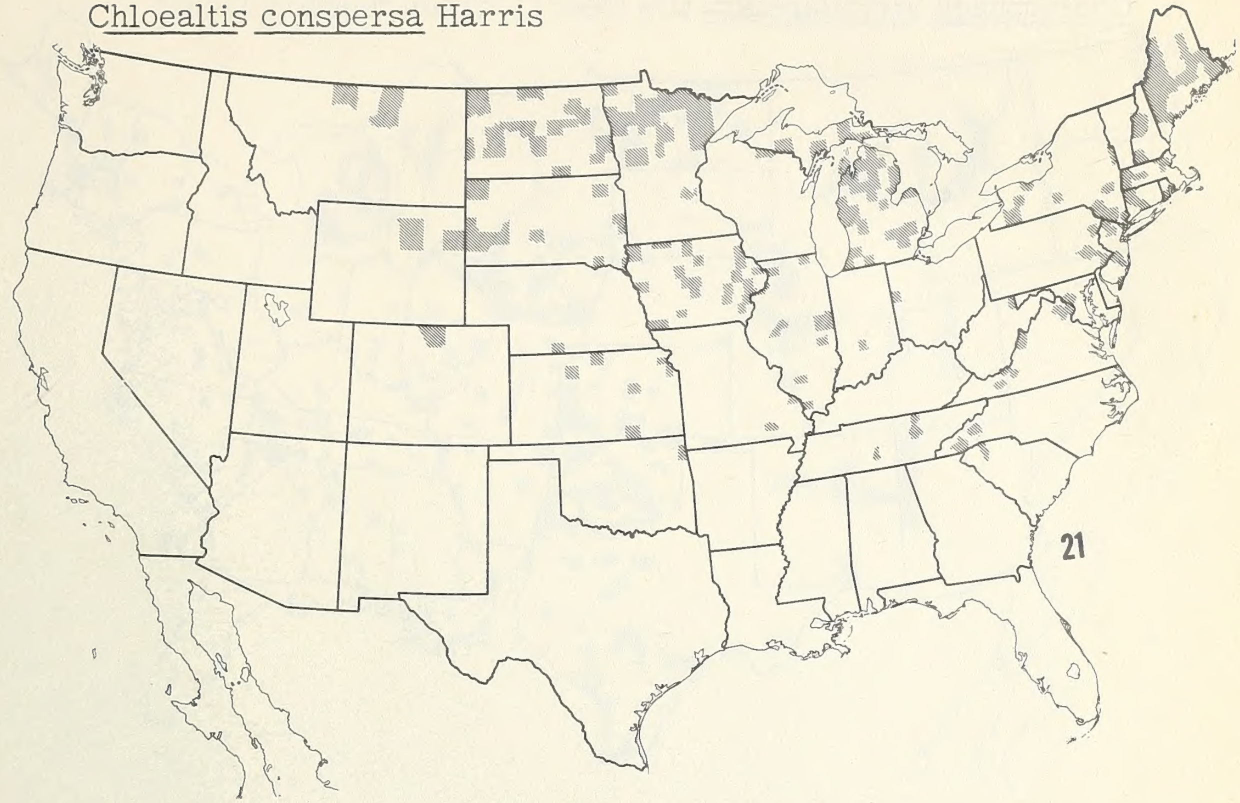
Campylacantha olivacea (Scudder)



Prepared by Ent. Res. Br., ARS, USDA
CEIR 6(33) August 17,1956

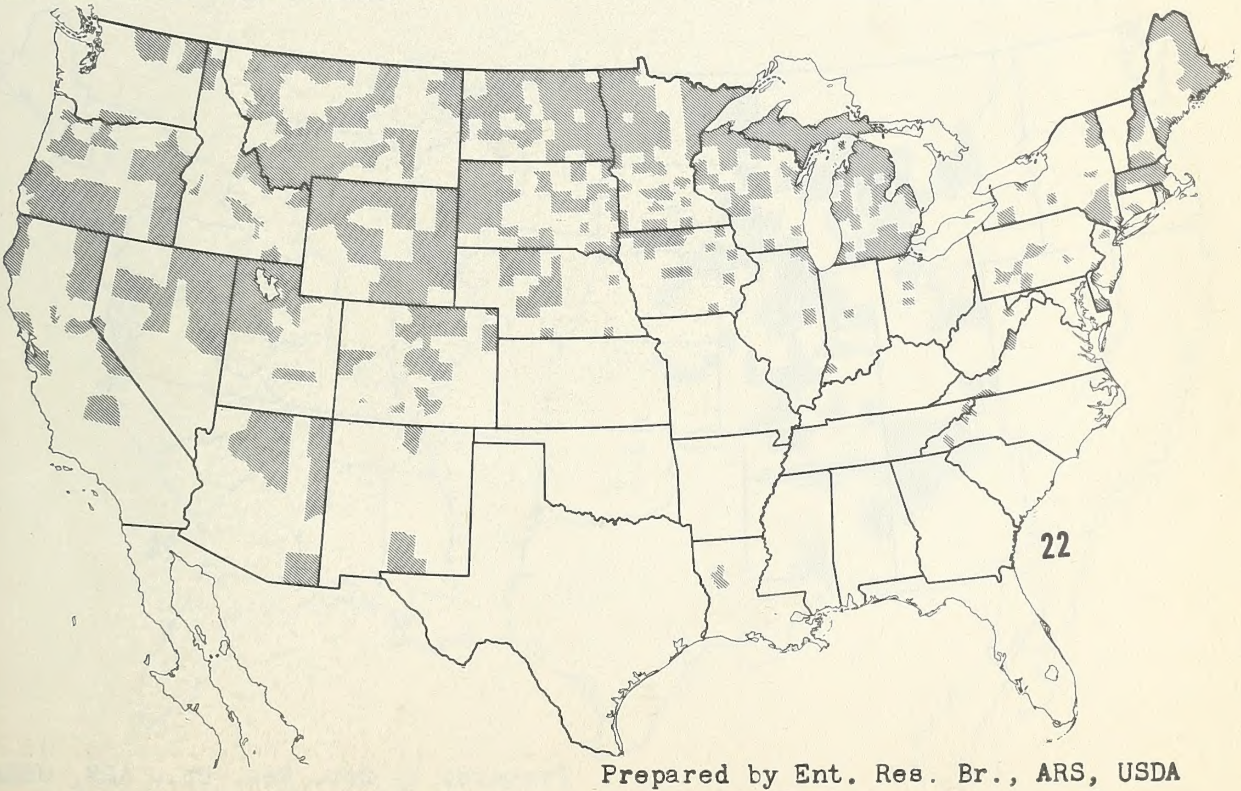
DISTRIBUTION OF RANGE GRASSHOPPERS

Chloealtis conspersa Harris



21

Chorthippus longicornis (Latreille)



22

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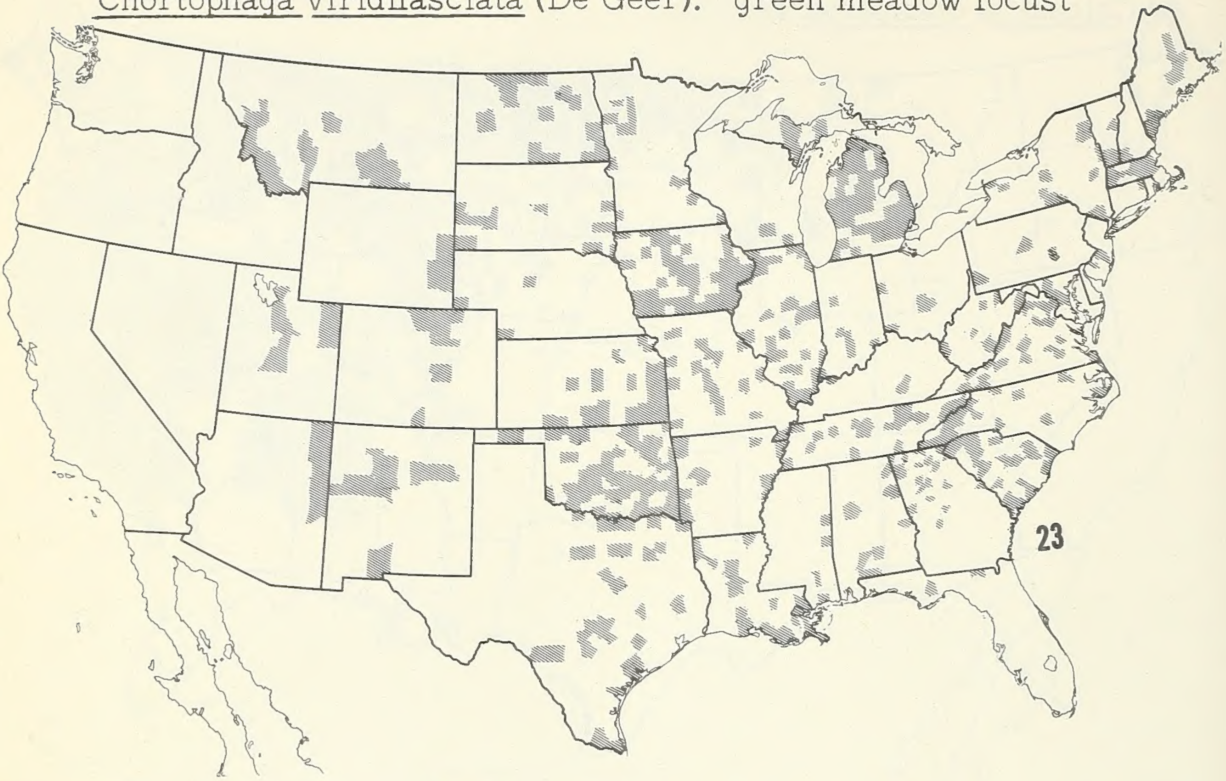
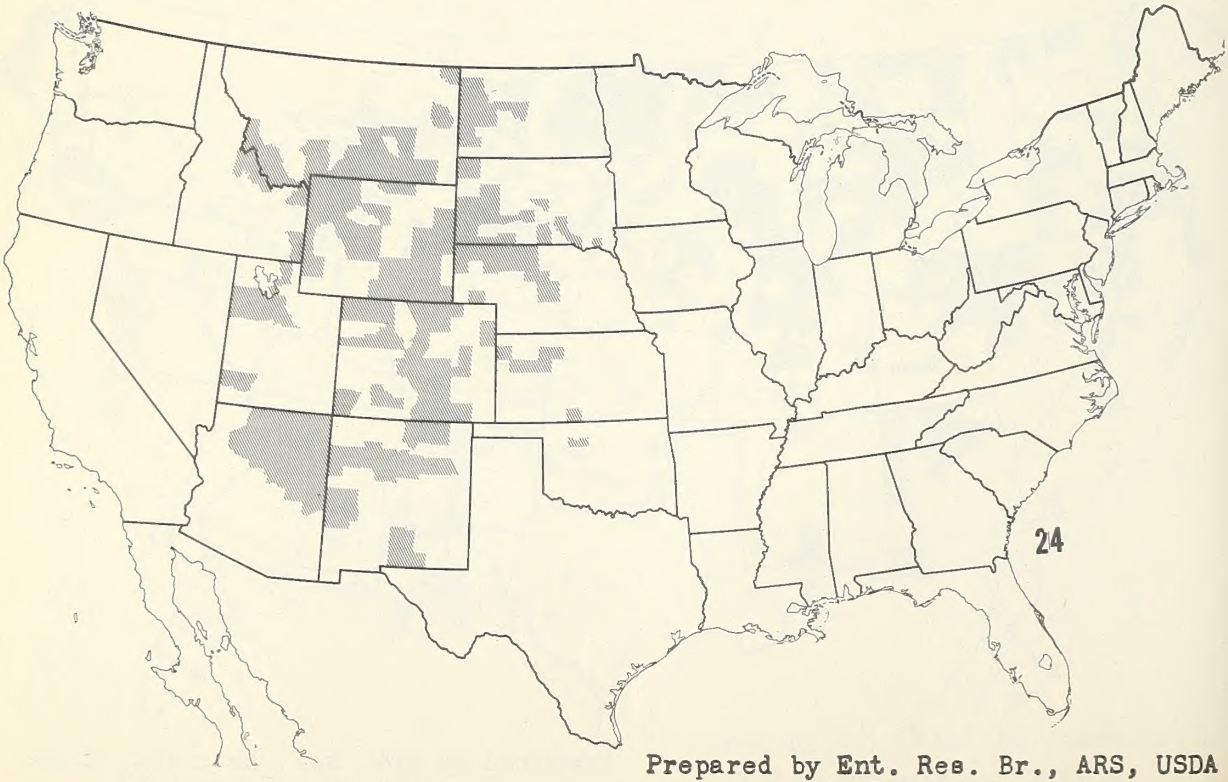
DISTRIBUTION OF RANGE GRASSHOPPERS

Chortophaga viridifasciata (De Geer). green meadow locust



Circotettix rabula Rehn and Hebard



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